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ABSTRACT

While innovation advocates have focused on the need to reform Philippine schools to meet the needs and demands of society, little has been done to change the teachers' practices. Recent studies have pointed to inadequate teacher training as one of the reasons for Filipino students' low achievement. This study was conducted to identify specific variables which contributed significantly to teacher competence, affect, familiarity, and perceived skill. The survey research method utilized was a three-part instrument administered by the principal investigator. Four independent variables were analyzed: place of work; academic subject; years of teaching experience; and training in instructional technology. Findings suggest specific variables significant in designing a curriculum for preparing teachers in implementing educational programs. The results of the competence test of this study imply a need for training on the use of instructional design and in the instructional technology field. (Contains 28 references.) (Author/JLB)

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Title:

Teachers' Competence, Affect, Familiarity, and Perceived Skill Regarding Instructional Technology

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ABSTRACT

While innovation advocates have focused on the need to reform Philippine schools to meet the needs and demands of society, little has been done to change the teachers' practices. Recent studies have pointed to inadequate teacher training as one of the reasons for Filipino students' low achievement. This study was conducted to identify specific variables which contributed significantly to teacher competence, affect, familiarity and perceived skill. Four independent variables were analyzed: place of work, academic subject, years of teaching experience and training in instructional technology. Findings suggest specific variables significant in designing a curriculum for preparing teachers in implementing educational programs.

Purpose of the Study

This study was undertaken in response to recent, widespread calls for reforms and improvements in Philippine schools, secondary schools in particular (Congressional Commission on Education, 1991; Cortes, 1990; Quisumbing, 1987; Sutaria, 1989). It has been acknowledged that changing these schools will require changing teachers' practices, since teachers have the major responsibility for implementing educational programs (Gonzales, 1986). Innovation advocates recognize the contribution of technology in reforming the school system. The technology brought earlier to the military (Bush, 1990) and industry (Geber, 1990) has set the pace and opened great promises of what technology can bring to education. Instructional technology (IT) with its system of designing, implementing and evaluating instruction, seems to offer a body of principles and techniques that can improve instructional practice and curriculum development. This study was undertaken to determine:

1. How competent are Philippine teachers in the use of instructional design and technology?

2. To what e..ent do Philippine teachers value instructional design and technology?

3. How familiar are Philippine teachers with instructional design and technology?

4. To what extent do Philippine teachers believe that they are skilled in the use of instructional design and technology?

Literature Review

Studies of Philippine education from the Monroe Survey in 1925 (Cortes, 1993) to the Congressional Commission on Education Report in 1991 have consistently reported the low levels of achievement among students. The findings showed that, "Pupils on the average learn only 55 percent or even less of what must be learned at every grade level" (Congressional Commission on Education Report, 1991, p. 10). The Congressional Commission on Education Report has generated a lot of concern from both the government and non-government sectors. Rama (1993) expounds the theory of economic development being dependent on the literacy level of the people, noting that "The better educated the people, the more prosperous a country. By the same token, the poorer the standard of education, the poorer the country" (p. 4). Unfortunately while the 1990 Philippine Census of Population and Housing claims 93.5 percent literacy (cited in Braid, 1993), the Functional Literacy Education and Mass Media Survey establishes only 73.2 percent of those ten years old and above as functionally literate (cited in Santos, 1993). Braid (1993) defines functional literacy as enabling "the individual to survive and function within his society" (p. 16).

Education which can help propel the Philippines to its dream of economic prosperity in the year 2000 (Braid, 1993) requires quality teachers. "Time and again the success of educational reforms has been found to be decisively dependent on ... the quality of teachers. No education system can rise too far beyond the level of the teachers" (Roy Singh, 1991, p. 75). If teachers are not proficient to teach, the quality of education equally suffers. Cortes (1993) attributes the problem of quality education to varied factors, but stresses that the

key to quality education are the teachers. An earlier study (Cortes, 1987) has confirmed that the teacher factor contributes to the low level achievement of Filipino students. Equally the Congressional Commission on Education Report (1991) singled out the teacher as the most important factor in education whose influence as a change agent in society is beyond question.

Earlier reports on teacher competence have shown the low qualifications of many teachers to teach subjects they have been assigned to teach (Gonzales, 1989; Sutaria, 1989; Tarvin & Faraj, 1990). This condition could be traced to poor teacher training (Congressional Commission on Education Report, 1991). To correct the flaws, the Congressional Commission on Education Report (1991) has recommended two important points among others: 1) strengthening pre-service teacher education, and 2) improving and expanding the in-service training programs for teachers.

Quality teaching is defined operationally as skills in teaching, production of instructional media and test and measurement (Salinas, 1989). Teachers are expected to have solid background in the psychology of teaching and learning, a variety of teaching strategies and an adequate knowledge of what to teach (Cortes, 1993). Philippine education calls for reforms which include a system to improve instructional practices. The field of instructional technology, with a system in designing, implementing and evaluating the total process of instruction (Reiser, 1987) offers the mode of reform for Philippine education.

Although before this study reported herein there had been no studies involving Philippine secondary school teachers' competence, affect, familiarity and perceived skills regarding instructional design and technology, generalizations regarding specific variables treated in this study have appeared in some literature.

Knupfer's study (1988) showed that teachers in urban areas had more in-service training than teachers in rural areas. Training was observed to have a significant correlation to positive attitude towards innovations (Burke, 1986; Knupfer, 1988; Mims, 1975· Salinas, 1989; Streeter, 1967; Woolsey, 1986). In-service training consistently improved teachers' performance (Cortes, 1993).

Dawson (1977) found physical science majors to have significantly higher scores on the IT Attitude Scale than social sciences majors. Likewise physical science teachers were noted to have more positive attitude towards microcomputers than the social sciences teachers (Fary, 1989).

Ewing's study (1986) revealed that the use of IT was a function of users' experience and familiarity with technology. Computer anxiety was affected by lack of skills and resistance declined with familiarity and experience with automated technology (Albritton & Sievert, 1984). Van Duinen (1975) noted in his study that sex, educational attainment, and number of years in the teaching service significantly influence the expressed knowledge of, attitude towards and experiences of teachers in instructional development.

It may be concluded from this summary of literature review that to introduce change in schools a concerted effort should be focused on the teacher, the key implementor of change. Probably among the important variables to influence teachers' competence, affect, familiarity and perceived skills regarding instructional design and technology are teachers' place of work, field of specialization, training, and years of teaching experience. All these criteria were included in this study in identifying training needs of Philippine secondary school teachers.

Method

The survey research method employing face-to-face data collection was used in this study.

Subjects

Subjects were 389 Philippine secondary school teachers drawn via stratified, multi-stage, random sample to represent rural (Albay), urban (Iloilo), and metropolitan (Manila) areas. These teachers represented both physical science and social science instructors (academic subject), with teaching experience of from 1 to 20+ years, and with different levels of training (College plus Inservice, College, Inservice and No Training) in instructional technology. These four factors were the independent variables in the study. Complete data were obtained on 370 (95%) of the sample.

Instruments

A three-part instrument was developed for the study. Part I - Competence Test - was a test of instructional design skills. This portion of the instrument (21 items) focused on the seven instructional design components described in Dick and Reiser's (1989) book, *Planning Effective Instruction*. Part II - Instructional Technology Scale (IT Scale) - of the instrument consisted of 38 phrases with an accompanying Likert scale to assess the respondents' perceived skill, familiarity, and values regarding instructional media and instructional design. Part III of the instrument dwelt on demographic information such as place of work, field of specialization, years of teaching experience and training in instructional technology. The instrument was pilot tested before it was used in the study.

Procedures

In most schools the primary investigator was able to gather the teachers in a single location to administer the research instrument. The exception was in Manila where overcrowding in classrooms and the consequences of recent natural disasters in the Philippines required that school principals supervise the distribution and collection of the completed instrument. Completed questionnaires were picked up by the primary investigator on the average of one week from the date of delivery. The data collection took about two months as it required travel both by land and air to gather the materials from the different islands in the country.

Data Analysis

Data gathered from Part I of the questionnaire were coded according to correct answers, while demographic data (Part III) were coded according to each respondent's region, province/city, years of teaching experience, educational level completed, age, academic subject, and IT training. Part II of the questionnaire was coded in the same way as the five-point scale used: 5 - A complete extent; 4 - A considerable extent;
3 - A moderate extent; 2 - A very little extent; and 1 - No extent. The completed answer sheets were optically scanned. Besides descriptive statistics, ANOVA was used to test for

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significant differences in competence, perceived skill, familiarity, and values based upon the four independent research variables -- region, academic subject, training in instructional technology and years of teaching experience. Where variables yielded a significant F value, a Scheffe Post Hoc Test was used to detect which mean differences contributed to the significance. Correlational and partial correlational analyses were used to determine the relationships among the study's dependent variables -- competence, perceived skill, familiarity, and values regarding instructional design and technology. All data were analyzed using the Statistical Analysis System.

The questionnaire was tested for internal consistency reliability. The resulting Cronbach alpha for each scale of the questionnaire was determined. The reliability calculations were processed using the ANLITH system.

For the purpose of reporting the data, the average Likert scale ratings were divided by 5 and results reported as percentage. Mean raw scores on the competence test were divided by 45 and reported as percentage.

Results and Analysis

Competence of Philippine teachers in the use of instructional design and technology

The data pertinent to research question 1 show that the mean proficiency score was 60%. The Cronback's alpha for the proficiency test was .56.

Significant differences were observed among the means of the teachers grouped by levels of training in instructional design and technology. The groups which contributed to the significant F value were the College plus Inservice (teachers who have College and Inservice training in instructional technology) and the Inservice training groups. No significant differences were observed among the mean responses of teachers grouped by region, academic subject, and years of teaching experience.

Two notable findings were observed when means of perceived skill, familiarity, and value were compared with the proficiency means (see Table 1). Albay consistently ranked lowest in self-rated perceived skill, familiarity, and value regarding instructional design and technology, but ranked highest on the competence test.

Table 1
Means of Respondents Grouped by the Four Independent Research Variables on the Four Research Scales Converted to Percentage

Group	Familiarity	Skill	Value	Competence
Albay	74.6	68.6	74.6	60.6
Iloilo	76.8	69.6	75.6	59.6
Manila	76.0	71.0	75.8	59.0
Physical Sc.	76.4	69.8	76.0	60.7
Social Sc.	76.0	70.4	75.4	58.9
College+Inservice	79.6	74.4	80.6	64.8
College	80.6	73.0	79.0	60.4
Inservice	76.4	70.4	75.6	58.4
No-Training	72.4	66.4	72.6	60.8
0-1 year	78.8	66.2	80.8	60.6
2-3 years	72.4	64.8	73.2	62.0
4-5 years	68.4	61.2	65.8	58.8
6-7 years	70.6	63.2	70.0	60.3
8-9 years	71.0	66.2	71.8	61.2
10-11 years	71.0	62.0	69.4	58.7
12-13 years	73.2	64.8	71.8	59.2
14-15 years	69.6	65.0	70.8	57.0
16-17 years	68.8	61.4	69.2	59.4
18-19 years	74.2	66.4	74.4	62.4
20 & above years	69.6	64.2	69.2	57.9

Similarly, an unusual finding was observed among the No-Training group which perceived themselves to be less familiar with, and less skilled in the use of instructional design and technology. They also ranked lowest in value toward instructional design and technology. The mean score of the No-Training group on the competence test, although not statistically different from the other training groups, ranked second highest.

Competence and perceived skill, familiarity, and value showed little correlation, which means that knowledge of the perceived skill, familiarity, and value were not reliable indicators of teachers' actual competence in the use of instructional design and technology.

As a predictor of competence, perceived skill and value were found to be significant; however, the most important predictor of the competence score was training. Training accounted for 2.9% (see Table 2) of the competence score.

Table 2

Summary Table Comparing Familiarity, Perceived Skill, Value, and Training with Competence Scores (Partial Correlation)

Source	df	SS	MS	F	p	r^2	r
Familiarity	1	48.02	48.02	2.29	0.132	.0058	.076
Skill	1	170.17	170.17	8.11	0.004	.0207	.144
Value	1	149.21	149.21	7.07	0.008	.0180	.134
Training	3	237.65	79.21	3.77	0.011	.0289	.170
Error	363	7610.02	20.96				
Total	369	8215.07					

Values of Philippine teachers regarding instructional design and technology

The findings pertinent to research question 2 indicated a moderate extent of value toward selected components of instructional design and technology. All four comparison groups reported a mean value which fell within the range of moderate extent of value.

Significant differences in the mean value of instructional design and technology were observed among teachers grouped according to level of instructional design and technology training. The main contributor to the significant F value was the mean difference between the College plus Inservice and the No-Training groups.

There were no significant differences in the mean value regarding instructional design and technology among the three regions, the two academic subjects and the 11 groups of teachers grouped according to years of teaching experience selected for the study.

An examination of the mean responses by the four independent research variables (see Table 1) showed that value was highest among beginning teachers (0-1 year) and lowest among those with 4-5 years of teaching experience. Overall, means of value ranked second to those on familiarity, while perceived skill ranked lowest among the self-reported variables.

High positive correlations were observed between expressed value and familiarity and between value and perceived skill. The correlation between value and competence was statistically significant, but the correlation coefficient of r=.123 was not particularly important. As a predictor, value accounted for 1.8% (see Table 2) of the competence score.

The Cronback's alpha for the Instructional Technology Scale on the value variable was .94.

Familiarity of Philippine teachers with instructional design and technology

The findings pertinent to research question 3 indicated a moderate extent of familiarity with selected components of instructional design and technology. All four comparisons reported a mean value which fell within the range of moderate extent of familiarity. The medians were generally higher than the means, which indicated that there were more teachers who perceived themselves familiar with selected components of instructional design and technology than those who perceived themselves as less familiar.

Significant differences were observed among teachers grouped by level of training in instructional design and technology. The main contributors to the significant F value were the mean differences between the College and the No-Training groups and between the College plus Inservice and the No Training group.

No significant differences were noted on the mean responses of teachers from the three regions studied, teachers from the Physical Sciences and the Social Sciences, or the mean responses of teachers grouped by years of teaching experience.

An examination of the mean responses by the four independent research variables (see Table 1) showed that familiarity was highest among beginning teachers and lowest among those with 4-5 years of teaching experience. Overall, mean responses of familiarity ranked highest followed by the mean responses in value and perceived skill.

High positive correlations between familiarity and perceived skill and between familiarity and value were observed. The correlation between familiarity and competence was low (r=.064). Familiarity accounted for 0.58% (see Table 2) of the competence score.

The Cronback's alpha for the Instructional Technology Scale on the familiarity variable was .94.

Perceived skills in the use of instructional design and technology

The findings pertinent to research question 4 indicate a moderate extent of perceived skill regarding the use of instructional design and technology. All four comparisons reported a mean value which fell within the range of moderate extent of perceived skill. Comparisons of means and medians revealed very little difference between these measures of central tendency.

A significant difference was observed on the scale assessing perceived skill among the teachers grouped by levels of training in instructional design and technology. Contributors to the significant difference were observed between the Inservice and No-Training groups and between the College plus Inservice and the No-Training groups. No significant differences were observed on the mean responses of teachers grouped by region, academic subject, and years of teaching experience.

An examination of the mean responses by the four independent research variables (see Table 1) showed that perceived skill regarding the use of instructional design and technology was highest among teachers with College plus Inservice training. The lowest mean was among teachers with 4 - 5 years of teaching experience.

Perceived skill, although not correlated with competence, was highly correlated with familiarity and value. Perceived skill was observed to account for 2% of the competence score (see Table 2).

The Cronback's alpha for the Instructional Technology Scale on the perceived skill variable was .93.

Summary

Data analysis revealed the following major findings:

Among the four independent variables (place of work, academic subject, training and years of teaching experience), only training in instructional technology was significantly related to differences in competence, perceived skill, familiarity, and values regarding instructional design and technology.

A significant difference was consistently observed for respondents with College plus Inservice training both on the IT Scale and the Competence Test. The No Training group consistently ranked lowest among the training groups on the IT Scale. Although the Competence Test score of the No Training group was not statistically different, it ranked second highest topping those with either only College or only Inservice training.

There were very high correlations among the variables of perceived skill, familiarity, and values. On the other hand, correlations between these "self-reported" variables and assessed competence in instructional design were very low.

Training in instructional technology was the single most important predictor of scores on the competence test, yet it accounted for a relatively small amount of the variance (2.9%).

Respondents reported moderate degrees of perceived skill, familiarity, and positive value toward instructional design and technology; their average score on the competence test was 60%.

Conclusions and Recommendations

The results of the study suggest the need to interpret any "self-reported" data regarding familiarity with or competence in instructional design with extreme caution. Needs assessment that rely on self-assessments may be very inaccurate. The results suggest that the constructs of perceived skill, familiarity, and valuing may be nearly identical -- indistinguishable psychometrically. Urban/rural differences, academic subject specialty, and years of teaching experience are not significantly related to teachers attitudes or skills in instructional design and technology.

Only training in instructional technology was significantly related to greater perceived skill in, familiarity with, and greater valuing of instructional design and technology and increased competence in instructional design. Teachers with College plus Inservice training were the only group which had consistently high mean responses in their competence, perceived skill, affect, and familiarity. This suggests that both College and Inservice training are required to increase the actual level of competence of Philippine secondary school teachers regarding instructional design and technology. The finding which indicates that the College training and Inservice training groups performed no better than those with No Training raises the issue of training quality provided to both groups at the preservice and inservice levels. As a result, a review of the preservice curriculum relative to the selected components of IT is in order. Likewise, the inservice training programs need to be carefully examined.

The Competence Test of this study emphasized basic teaching competencies, such as writing objectives, developing test items, choosing teaching strategies, etc.. A mean performance of 60% seemed to suggest that whatever upgrading of teaching competencies was conducted, the training did not adequately provide the needed skills to improve the teaching competencies of teachers. Sixty percent performance on planning, implementing, and evaluating instruction strongly implies a need for training on the use of instructional design.

Since the data is correlational, causation cannot be confirmed. However, this finding is supportive of the importance of training especially in the instructional technology field.

Educational implications include the need to review or perhaps refocus the present preservice curriculum and inservice training programs for secondary school teachers. Training programs should be designed based on actual needs, not on the perceived needs of teachers. Training should focus on skills essential for effective instruction. The preservice curriculum should be reviewed in the light of the findings in this study.

Research implications include the investigation of other variables which could contribute to teachers' performance. Other research concerns are the determination of the

extent to which school administrators, teaching schedule, or loading can contribute to teachers' high performance. There is also a need to replicate the study with other populations. It is apparent that there is a lack of well developed, validated instruments to measure competence in instructional design. The instrument used in this study could serve as a beginning point to develop such a tool.

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